What is claimed

1. A system for analyzing a condition of a machine having moving parts, said system comprising:

a.) a measuring point attached to the machine, the measuring point comprising:

a means for storing data;

a connector; and

a first means for transmitting and receiving data connected to the means for storing data; and

b.) an analysis apparatus comprising:

a means for transferring vibrations of the machine to the analysis apparatus;

a means for converting the vibrations into vibration data;

a second means for transmitting and receiving data arranged to allow bi-directional communication with the first means for transmitting and receiving data;

a means for allowing entry by a user of characteristic data that define technical type values for at least one of the moving parts of the machine; and

a means for processing data connected to the means for converting the vibrations, the second means for transmitting and receiving data, and the means for allowing entry of the characteristic data;

wherein the means for processing data is programmed to transmit the characteristic data entered by the user through the first and second means for transmitting and receiving data to the means for storing data on the measuring point.

2. The system of claim 1, wherein the means for processing data is further programmed to retrieve the characteristic data stored in the means for storing data, generate a first condition value using the characteristic data and the vibration data, and store the first condition value in the means for storing data.

3. The system of claim 2, wherein the means for processing data is further programmed to retrieve the characteristic data and the first condition value stored in the means for storing data, generate a second condition value using the characteristic data and the vibration data, and compare the first and second condition values.

4. A system for analyzing a condition of a machine having moving parts, said system comprising:

a.) a measuring point attached to the machine, the measuring point comprising:

a memory device;

a measuring point connector; and

a measuring point receiver/transmitter connected to the memory device; and

b.) an analysis apparatus comprising:

an analysis apparatus connector constructed to mechanically engage the measuring point connector so that vibrations of the machine are transferred to the analysis apparatus connector;

an accelerometer connected to receive the vibrations of the machine, and producing as an output vibration data;

an analysis apparatus receiver/transmitter;

a user-operable data entry device; and

a processor connected to the accelerometer, the analysis apparatus receiver/transmitter, and the data entry device;

wherein the processor is programmed to transmit characteristic data entered by the user through the analysis apparatus receiver/transmitter and the measuring point receiver/transmitter to the memory device on the measuring point, the characteristic data defining technical type values for at least one of the moving parts of the machine.

5. The system of claim 4, wherein the processor is further programmed to retrieve the characteristic data stored in the memory device, generate a first condition value using the characteristic data and the vibration data, and store the first condition value in the memory device.

6. The system of claim 5, wherein the processor is further programmed to retrieve the characteristic data and the first condition value stored in the memory device, generate a second condition value using the characteristic data and the vibration data, and compare the first and second condition values.

7. A method of analyzing a condition of a machine having moving parts, said method comprising the steps of:

providing a measuring point attached to the machine, the measuring point comprising a memory device and a data transceiver;

providing an analysis apparatus constructed to mechanically engage the measuring point, the analysis apparatus comprising a data transceiver, a processor, an accelerometer, and a user data entry device;

engaging the analysis apparatus with the measuring point so that vibrations of the machine are transferred to the analysis apparatus and used by the accelerometer to generate vibration data;

entering characteristic data that define technical type values for at least one of the moving parts of the machine through the data entry device;

using the processor to generate a condition value based on the vibration data and the characteristic data;

storing the condition value in the memory device; and

storing the characteristic data in the memory device.

8. A method of analyzing a condition of a machine having moving parts, said method comprising the steps of:

providing a measuring point attached to the machine, the measuring point comprising a memory device and a data transceiver, the memory device having stored

therein characteristic data that define technical type values for at least one of the moving parts of the machine;

providing an analysis apparatus constructed to mechanically engage the measuring point, the analysis apparatus comprising a data transceiver, a processor, an accelerometer, and a user data entry device;

engaging the analysis apparatus with the measuring point so that vibrations of the machine are transferred to the analysis apparatus and used by the accelerometer to generate vibration data;

retrieving the characteristic data from the memory device;

using the processor to generate a condition value based on the vibration data and the characteristic data; and

storing the condition value in the memory device.

9. A method of analyzing a condition of a machine having moving parts, said method comprising the steps of:

providing a measuring point attached to the machine, the measuring point comprising a memory device and a data transceiver, the memory device having stored therein characteristic data that define technical type values for at least one of the moving parts of the machine, and a reference condition value;

providing an analysis apparatus constructed to mechanically engage the measuring point, the analysis apparatus comprising a data transceiver, a processor, an accelerometer, and a user data entry device;

engaging the analysis apparatus with the measuring point so that vibrations of the machine are transferred to the analysis apparatus and used by the accelerometer to generate vibration data;

retrieving the characteristic data from the memory device;

retrieving the reference condition value from the memory device;

using the processor to generate a current condition value based on the vibration data and the characteristic data; and

comparing the reference condition value and the current condition value.

10. A system for analyzing a condition of a machine having moving parts, said system comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface; and

an analysis apparatus comprising:

a microprocessor;

a non-volatile memory;

a sensor unit constructed and arranged to connect to the connection coupling so that vibrations of the machine are transmitted to the sensor unit; and

an analysis apparatus communication interface constructed and arranged to allow bi-directional communication with the measuring point communication interface;

wherein the non-volatile memory stores instructions adapted to be executed by the microprocessor to perform the steps of:

calculating a condition value based on interpretation data related to the machine and measured vibration values from the sensor unit; and

storing the calculated condition value in the information carrier of the measuring point as a reference value.

11. The system of claim 10, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

12. The system of claim 10, wherein the non-volatile memory additionally stores instructions adapted to be executed by the microprocessor to perform the steps of:

requesting measured vibration values from the sensor unit;

acquiring interpretation information and a condition reference value from the information carrier;

calculating a condition current value based on the measured vibration values and the interpretation information; and

producing a relation value based on the condition reference value and the condition current value.

13. The system of claim 12, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first

component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

14. The system of claim 12, wherein the relation value represents a division of the condition current value by the condition reference value.

15. The system of claim 12, wherein relation value represents a difference between the condition current value and the condition reference value.

16. A system for analyzing a condition of a machine having moving parts, said system comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface; and

an analysis apparatus comprising:

a microprocessor;

a non-volatile memory;

a sensor unit constructed and arranged to connect to the connection coupling so that vibrations of the machine are transmitted to the sensor unit; and

an analysis apparatus communication interface constructed and arranged to allow bi-directional communication with the measuring point communication interface;

wherein the non-volatile memory stores instructions adapted to be executed by the microprocessor to perform the steps of:

acquiring the interpretation information and the condition reference value from the information carrier;

calculating a condition current value based on current measured vibration values from the sensor unit and the interpretation information; and

producing a relation value based on the condition reference value and the condition current value.

17. The system of claim 16, wherein the condition reference value represents a condition of the machine at an earlier point in time.

18. The system of claim 16, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

19. The system of claim 16, wherein the relation value represents a division of the condition current value by the condition reference value.

20. The system of claim 16, wherein relation value represents a difference between the condition current value and the condition reference value.

21. A system for analyzing a condition of a machine having moving parts, said system comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface;

means for analyzing the machine by measuring vibration of the machine through the connection coupling, reading information related to the machine from the information carrier through the measuring point communication interface, and determining a current state of the machine based on the measured vibration;

wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

22. The system of 21, wherein the information carrier contains information related to a measurement taken at the connection coupling of the first component.

23. A system for analyzing a condition of a machine having moving parts, comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface;

a sensor unit comprising a vibration transducer, the sensor unit being structured to physically engage the connection coupling of the measuring point so that

vibrations of the machine at the measuring point are transferred to the vibration transducer;

an analysis apparatus comprising a microprocessor electrically connected to receive digital data corresponding to an output of the transducer, and an analysis apparatus communication interface connected to the microprocessor;

wherein the system is arranged to allow bidirectional communication between the measuring point communication interface and the analysis apparatus communication interface, and wherein the measuring point communication interface and the analysis apparatus communication interface are constructed to allow the communication without ohmic contact therebetween.

24. The system of claim 23, wherein the measuring point communication interface and the analysis apparatus communication interface are constructed to communicate with one another by radio transmissions.

25. The system of claim 23, wherein the measuring point communication interface and the analysis apparatus communication interface are constructed to communicate with one another by optical transmissions.

26. The system of claim 25, wherein the optical transmissions comprise pulses of infrared light.

27. The system of claim 25, wherein the system is constructed to allow the bidirectional communication between the measuring point communication interface and the analysis apparatus communication interface while the sensor unit is physically engaged with the connection coupling of the measuring point.

28. A method for analyzing a condition of a machine having moving parts, the machine having a measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface, the method comprising the steps of:

connecting an analysis apparatus having a sensor unit comprising a vibration transducer to the measuring point so that vibrations of the machine at the measuring point are transferred to the vibration transducer;

converting an output of the transducer to digital data;

analyzing the digital data to produce a first condition value; and

communicating the first condition value through an analysis apparatus communication interface and the measuring point communication interface to the information carrier;

wherein the communication between the measuring point communication interface and the analysis apparatus communication interface is performed without ohmic contact therebetween; and

wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component

comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

29. The method of claim 28, further comprising the steps of:

after communicating the first condition value to the information carrier, repeating the connecting, converting, and analyzing steps to produce a second condition value;

communicating the first condition value from the information carrier to the analysis apparatus through the measuring point communication interface and the analysis apparatus communication interface; and

comparing the first and second condition values.

30. A system for analyzing a condition of a machine having moving parts, said system comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface; and

an analysis apparatus comprising:

a microprocessor;

a non-volatile memory;

a sensor unit constructed and arranged to connect to the connection coupling so that vibrations of the machine are transmitted to the sensor unit; and

an analysis apparatus communication interface constructed and arranged to allow bi-directional communication with the measuring point communication interface without ohmic contact;

wherein the non-volatile memory stores instructions adapted to be executed by the microprocessor to perform the steps of:

calculating a condition value based on measured vibration values from the sensor unit; and

storing the calculated condition value in the information carrier of the measuring point as a reference value.

31. The system of claim 30, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

32. The system of claim 30, wherein the non-volatile memory additionally stores instructions adapted to be executed by the microprocessor to perform the steps of:

requesting measured vibration values from the sensor unit;

acquiring a condition reference value from the information carrier;

calculating a condition current value based on the measured vibration values; and

producing a relation value based on the condition reference value and the condition current value.

33. The system of claim 32, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

34. The system of claim 32, wherein the relation value represents a division of the condition current value by the condition reference value.

35. The system of claim 32, wherein relation value represents a difference between the condition current value and the condition reference value.

36. A system for analyzing a condition of a machine having moving parts, said system comprising:

a measuring point attached to the machine, the measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface; and

an analysis apparatus comprising:

a microprocessor;

a non-volatile memory;

a sensor unit constructed and arranged to connect to the connection coupling so that vibrations of the machine are transmitted to the sensor unit; and

an analysis apparatus communication interface constructed and arranged to allow bi-directional communication with the measuring point communication interface without ohmic contact;

wherein the non-volatile memory stores instructions adapted to be executed by the microprocessor to perform the steps of:

acquiring the condition reference value from the information carrier;

calculating a condition current value based on current measured vibration values from the sensor unit; and

producing a relation value based on the condition reference value and the condition current value.

37. The system of claim 36, wherein the condition reference value represents a condition of the machine at an earlier point in time.

38. The system of claim 36, wherein the measuring point comprises first and second physically separate components individually attached to the machine, the first component comprising the connection coupling, the second component comprising the information carrier and the measuring point communication interface.

39. The system of claim 36, wherein the relation value represents a division of the condition current value by the condition reference value.

40. The system of claim 36, wherein relation value represents a difference between the condition current value and the condition reference value.

41. A method for analyzing a condition of a machine having moving parts, the machine having a measuring point comprising a connection coupling, an information carrier, and a measuring point communication interface, the method comprising the steps of:

connecting an analysis apparatus having a sensor unit comprising a vibration transducer to the measuring point so that vibrations of the machine at the measuring point are transferred to the vibration transducer;

converting an output of the transducer to digital data;

analyzing the digital data to produce a first condition value; and

communicating the first condition value through an analysis apparatus communication interface and the measuring point communication interface to the information carrier;

wherein the communication between the measuring point communication interface and the analysis apparatus communication interface is performed without ohmic contact therebetween; and

wherein the connection coupling, the information carrier, and the measuring point communication interface are all arranged within a single component attached to the machine.

42. The method of claim 41, further comprising the steps of:

after communicating the first condition value to the information carrier, repeating the connecting, converting, and analyzing steps to produce a second condition value;

communicating the first condition value from the information carrier to the analysis apparatus through the measuring point communication interface and the analysis apparatus communication interface; and

comparing the first and second condition values.